

Claims:

- (1) A method of forming a wear-resistant hardfaced contact area, comprising the steps of:

Selectively coating a predetermined contact area of a workpiece with a hardface coating material capable of forming a diffusion boundary between the hardface coating material and the workpiece; and

Performing a hot isostatic heat treatment process to form the diffusion boundary between the hardface coating material and the workpiece to form a wear-resistant hardfaced contact area diffusion bonded to the workpiece.

- (2) A method of forming a wear-resistant hardfaced contact area according to claim 1; further comprising the step of masking off the predetermined contact area before the step of selectively coating.

- (3) A method of forming a wear-resistant hardfaced contact area according to claim 1; further comprising the step of performing a sintering heat treatment before the step of performing the hot isostatic heat treatment to limit the occurrence of bubbles on the surface of the hardface coating material after the isostatic heat treatment step.

- (4) A method of forming a wear-resistant hardfaced contact area according to claim 3; wherein the sintering heat treatment is performed at a temperature substantially the same as the temperature of the hot isostatic heat treatment.

- (5) A method of forming a wear-resistant hardfaced contact area according to claim 1; wherein the hardface coating material comprises an alloy with substantially no oxide forming constituents so as to avoid the formation of oxide inclusions in the coating material.

- (6). A method of forming a wear-resistant hardfaced contact area according to claim 1; wherein the hardface coating material comprise an alloy characterized by improved oxidation and wear resistance at elevated temperatures consisting essentially in weight percent of about:

	Percent
Carbon	0.07 - 1.00
Manganese	1.00
Silicon	1.00
Chromium	26.00 - 30.00
Nickel	4.00 - 6.00
Tungsten	18.00 - 21.00
Boron	.005 - 0.100
Vanadium	0.75 - 1.25
Iron	3.00
Lanthanum	0.02 - 0.12
Cobalt	remainder

(7). A method of forming a wear-resistant hardfaced contact area according to claim 1; wherein the hardface coating material comprise an alloy characterized by improved oxidation and wear resistance at elevated temperatures consisting essentially in weight percent of about:

	Percent
Carbon	0.08 max
Silicon	3.00 - 3.80
Phosphorus	0.03 max
Sulfur	0.03 max
Chromium	16.50 - 18.50
Molybdenum	27.00 - 30.00
Nickel + Iron	3.00 max
Nitrogen	0.07 max
Oxygen	0.05 max
Lanthanum	0.02 – 0.12
Cobalt	remainder

(8) A method of forming a wear-resistant hardfaced contact area on the shroud section of a gas turbine engine blade, comprising the steps of:
 Selectively coating a predetermined contact area of a shroud section of a gas turbine engine blade with a hardface coating material capable of forming a diffusion boundary between the hardface coating material and the shroud section; and
 Performing a hot isostatic heat treatment process to form the diffusion boundary between the hardface coating material and the shroud section to form a wear-resistant hardfaced contact area diffusion bonded to the shroud section.

- (9) A method of forming a wear-resistant hardfaced contact area on the shroud section of a gas turbine engine blade according to claim 8; further comprising the step of masking off the predetermined contact area before the step of selectively coating.
- (10) method of forming a wear-resistant hardfaced contact area on the shroud section of a gas turbine engine blade according to claim 8; further comprising the step of performing a sintering heat treatment before the step of performing the hot isostatic heat treatment to limit the occurrence of bubbles on the surface of the hardface coating material after the isostatic heat treatment step.
- (11) A method of forming a wear-resistant hardfaced contact area on the shroud section of a gas turbine engine blade according to claim 10; wherein the sintering heat treatment is performed at a temperature substantially the same as the temperature of the hot isostatic heat treatment.
- (12) A method of forming a wear-resistant hardfaced contact area on the shroud section of a gas turbine engine blade according to claim 8; wherein the hardface coating material comprises an alloy with substantially no oxide forming constituents so as to avoid the formation of oxide inclusions in the coating material.
- (13). A method of forming a wear-resistant hardfaced contact area on the shroud section of a gas turbine engine blade according to claim 8; wherein the hardface coating material comprise an alloy characterized by improved oxidation and wear resistance at elevated temperatures consisting essentially in weight percent of about:

	Percent
Carbon	0.07 - 1.00
Manganese	1.00
Silicon	1.00
Chromium	26.00 - 30.00
Nickel	4.00 - 6.00
Tungsten	18.00 - 21.00
Boron	.005 - 0.100
Vanadium	0.75 - 1.25
Iron	3.00
Lanthanum	0.02 - 0.12
Cobalt	remainder

(14). A method of forming a wear-resistant hardfaced contact area on the shroud section of a gas turbine engine blade according to claim 8; wherein the hardface coating material comprise an alloy characterized by improved oxidation and wear resistance at elevated temperatures consisting essentially in weight percent of about:

	Percent
Carbon	0.08 max
Silicon	3.00 - 3.80
Phosphorus	0.03 max
Sulfur	0.03 max
Chromium	16.50 - 18.50
Molybdenum	27.00 - 30.00
Nickel + Iron	3.00 max
Nitrogen	0.07 max
Oxygen	0.05 max
Lanthanum	0.02 – 0.12
Cobalt	remainder